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Subcommittee on Commerce, Trade, and Consumer Protection
Committee on Energy and Commerce
U.S. House of Representatives

RE: Hearing entitled, "Breeding, Drugs, and Breakdowns: The State of Thoroughbred Horseracing and the Welfare of the Thoroughbred Racehorse."

Testimony for June 19, 2008 of:

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Summary

- Musculoskeletal injuries are the major cause of racehorse death and attrition.
- Racehorses are much more likely to suffer catastrophic injuries as a result of inadvertent circumstances than as a result of intentional abuse.
- Opportunities for injury prevention are great because catastrophic injuries are the acute manifestation of a more chronic process, and many risk factors are manageable.
- Racing officials have embraced scientific evidence and mandated change for the benefit of equine welfare in the face of long-standing tradition and horsemen resistance.
- There is a need for tracking the racehorse population.
- Research funds are needed to provide scientific evidence for further changes to enhance equine and industry welfare.

Mr. Chairman and Members of the Subcommittee on Commerce, Trade, and Consumer Protection, thank-you for the opportunity to share our knowledge of racehorse musculoskeletal injuries and ongoing efforts for injury prevention.

California has monitored racehorse deaths for over 15 years. The California Horse Racing Board, a subcommittee of the California State Legislature, instituted a Postmortem Program in 1990, where all horses that die at a California racetrack under the jurisdiction of the Board undergo necropsy examination by pathologists at California Animal Health and Food Safety Diagnostic Laboratories of the School of Veterinary Medicine, University of California, Davis. Racetracks transport horses to necropsy facilities in this highly collaborative program. Industry organizations (e.g., Grayson Jockey Club Research Foundation, UC Davis Center for Equine Health) fund highly competitive, in-depth research projects on racehorse injuries and illnesses, conducted by University faculty and private veterinarians. Over 4,200 racehorses have been necropsied through this program. Necropsy programs have now been established in other states, and there are efforts to standardize reporting of necropsy findings nationwide.

Musculoskeletal injuries are the greatest cause of racehorse death and attrition. In California, 79% of deaths are associated with racing and training injuries. Although most fatal injuries occur during racing, over 32% of injuries occur during training activities. From 1990 to 2006, an increasing trend was observed for injury rates. The proportion of Thoroughbred horses with a fatal musculoskeletal injury during racing and training has risen from approximately 3 horses to 5 horses per 1000 Thoroughbred race starts. The proportion of Thoroughbred racehorses with a fatal musculoskeletal injury has risen from 17 horses to 24 horses per 1000 Thoroughbred horses that started a race. Musculoskeletal injuries

resulted in 19-33% of racehorses leaving training within a 3 month or less period in the United States. An example helps us appreciate the impact of these rates of turnover on a racetrack population. For a 19% turnover in a 3 month period, approximately 2 times the daily population would be required to maintain horses at the racetrack throughout the year, assuming that horseracing occurs throughout the year and horses that leave the racetrack do not return in the same year. These trends are disturbing, especially in light of the discoveries made through the California Postmortem Program. However, there is recent evidence for a reversal in the trend for injury rates.

Pathologic evidence indicates that many catastrophic, fatal musculoskeletal injuries are the acute manifestation of pre-existing, milder injuries that develop over several weeks to months. Mild injuries are typically repetitive, overuse injuries. As with any physical activity, bone incurs microscopic damage when loaded during exercise. Normally, damaged bone tissue is continually replaced by healthy bone tissue through the repair process. Key to understanding the implications of the repair process in elite athletes is the time course of events during repair of microdamage. Much like demolition of a building, a unit of damaged bone tissue can be removed rapidly (within days to 2 weeks). However, similar to constructing a new building, the orderly replacement of a unit of bone requires months. Consequently, when the repair process occurs regionally in response to the quick accumulation of focal microdamage there is a transient period of bone weakness that occurs after damaged bone has been removed and before completion of bone replacement. The focal weakness allows initiation of a complete fracture under otherwise, physiologic training and racing conditions. Racehorses can be inadvertently susceptible to a fracture by virtue of routine racing and training conditions, that is, *without* intentional abuse.

The clinical signs preceding fracture development may be subtle and difficult to detect. Consequently, there is a need to optimize the ability to detect injuries during the early stages of development. Advanced imaging techniques and accessibility to advanced imaging equipment are

continually improved. However, the potential for permitted medications to mask mild injury and to contribute to injury development needs to be assessed. The good news is that there is time during injury development for intervention for catastrophic injury prevention.

Injuries are multifactorial, with numerous contributing factors that create opportunities for injury prevention. Epidemiologic evidence indicates that horse characteristics (age, gender, quality), training and racing history, hoof management, horseshoe characteristics, pre-existing musculoskeletal injuries, racetrack characteristics (geometry, condition, and surface), and race features (e.g., class of race, purse) affect risk for injury. Several of these factors are likely to affect the rate of microdamage accumulation and can be managed for injury prevention. Key factors affect the magnitude and frequency of bone loading, and include exercise history, hoof conformation and shoeing, and race surface design. High exercise intensity increases risk for fatal injury and also for lay-up (inability to race). Hoof conformation and shoeing affect risk for injury because modifications can amplify loads to bones, tendons, and ligaments. Race surface characteristics affect the magnitude and nature of load transferred to the hoof.

Racing jurisdictions are actively addressing the injury problem. In fact, racehorse owners, trainers, and veterinarians; racetrack officials; and industry regulators have embraced scientific evidence and implemented changes for the benefit of equine welfare that countered long-standing traditions. Advanced imaging equipment has been installed at some major California racetracks to enhance early detection of injuries. Jurisdictions have mandated limitations on the height of a traction device, toe grabs, on horseshoes after studies demonstrated an association with increasing risk for injury with increasing height of toe grab. Recent scientific evidence demonstrated that a synthetic race surface imparts significantly lower loads and accelerations to the hoof during exercise. California mandated that all major racetracks replace traditional race surfaces with a synthetic race surface, at huge expense to racetrack management. Other racetracks have voluntarily replaced traditional race surfaces with

synthetic race surfaces. Initial, preliminary injury data support the concept that race surface design and management have large potential for injury prevention.

Racing communities are working collaboratively at a national level to address industry problems. Examples include the national summits that addressed equine welfare in 2006 and 2008 held by the Grayson-Jockey Club Research Foundation. These strategic planning sessions brought together scientists and leaders from all facets (breeding to racing, work force to management) of the racehorse industry to identify industry problems and develop recommendations for problem resolution. Summit recommendations are in various stages of implementation. Other efforts to develop and promote uniformity among rules for racing are actively underway.

However, the racing industry consists of complicated parts. I am unaware of an industry model that identifies relationships between the components of the industry. It is conceivable that management decisions inadvertently affect racehorse training and management, and thus have effects on equine health and welfare. The number of horses required to fulfill racing inventory while minimizing racehorse attrition is unknown. The underlying racehorse population is largely unknown. Medical data are difficult to retrieve.

Further scientific research is desperately needed to guide the industry. Changes, for example in racetrack surface design, are largely based on marketing factors because of sparse scientific data. Funds for research are generally limited to those generated by organizations such as the Grayson-Jockey Club Research Foundation and centers for equine health. In some states, a small portion of pari-mutuel funds is apportioned for equine research. However, research funds are sparse relative to the size of the industry. Equine research proposals are not competitive for federal funds because horses are not considered an agricultural product, nor related to human health. Dissemination of research findings should be optimized, perhaps by mandated continuing education of racetrack personnel.

Musculoskeletal injuries have a huge, adverse effect on equine welfare, and on the Thoroughbred racehorse industry. Although fatal musculoskeletal injuries have a relatively low prevalence, milder forms of these injuries have a high prevalence. There are great opportunities for intervention and injury prevention because injuries develop over weeks and months of time. Excellent candidates for injury prevention include enhancing management practices to minimize low hoof heel angle; incorporation of more frequent, shorter high speed works or races in exercise regimes; avoidance of excessive accumulation of high speed distances over short periods of time; recognition and rehabilitation of mild injuries; avoidance of use of high toe grabs; design of safer race surfaces; and reconsideration of permitted medications. It is important to achieve uniformity of racing surface mechanical properties among racetracks and for the design of specific surface materials to meet the spectrum of environmental conditions seen by horses. Key to tracking the prevalence of injuries and the success (or lack of success) of interventions is identification of the underlying racehorse population. The industry should consider a mechanism for identification of horses that can be used for horses' medical record, location, exercise, and movement; and racetrack horse inventory. The racehorse industry and federal granting agencies need to make a substantial investment in research related to equine welfare and in mandatory continuing education of horse owners and trainers, and racetrack veterinarians.

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